

Methods of and devices for transmitting and reproducing audio and/or video information
consisting of primary programs and commercials

The invention relates to methods of transmitting, receiving, and reproducing
audio and/or video information divided into primary and secondary/tertiary programs
(commercials), and to a device for carrying out these methods. Moreover, the invention
relates to methods of transmitting, receiving, and reproducing audio and/or video information
5 divided into primary and secondary information (commercials), and a device for carrying out
these methods.

Information that is broadcast on television or radio may often be divided into
primary and secondary information or programs, i.e. connected pieces of information,
according to its contents and its relevance to a consumer. Typically, primary information is
what the consumer really wants to view or listen to, and secondary information is additional
information like commercials, traffic announcements, stock news, weather reports or the like.
Primary and secondary information is generally transmitted in an alternating sequence and it
is also reproduced in that sequence. This gives the consumer no choice as regards the timing
of the secondary information or programs. Therefore, secondary information often appears at
unfavourable times.

US 5,333,091 discloses a video cassette recorder (VCR) that may be used to
record a transmission. During recording, the VCR tries to detect the start and end of
commercials (secondary information) and leaves corresponding time marks on the tape.
During playback of the tape, the VCR switches to a fast scan mode from each start of a
20 commercial to its end. The commercial may thus be skipped. However, there is no way to
influence the occurrence of commercials online during transmission.

WO 97/36424 discloses a method of displaying advertising information during
the time a video channel is changed on a display. The advertising information must be
transmitted to the display station in advance and stored there in order to be available at the
25 time a channel is changed.

A display station with a "circular buffer" is disclosed in US 5,371,551.
Transmitted audio and/or video information is continuously stored in the buffer and
transferred from the buffer to a display. The storage of transmitted information in the buffer
enables the user to jump forward and backward in the information to a limited degree,

allowing him to skip undesirable secondary information like commercials. However, the application of this procedure requires that the user watches the transmitted information with a certain delay so as to guarantee that the information already stored in the buffer allows a forward jump to be made. Moreover, commercials are totally excluded in this way though they are also of benefit for the consumer, because they can reduce the costs of producing primary programs.

Therefore, it is an object of the present invention to provide a method of and a device for transmitting and reproducing audio and/or video information divided into primary and secondary/tertiary programs (e.g. commercials), in which the timing of the secondary/tertiary programs is better and aimed at the individual consumer.

This object is achieved by methods according to claims 1, 2, 3 and/or 10 and devices according to claims 16, 17, and/or 20.

According to one aspect of the invention, a method of transmitting audio and/or video information is provided, said information being divided into primary, secondary and tertiary programs, the primary and secondary programs being transmitted as usually in an alternating sequence and the tertiary programs being transmitted parallel to the primary and/or secondary programs. Moreover, the invention provides a method of receiving these transmissions. With this method, the information is differentiated into primary, secondary and tertiary programs after reception according to their classification at transmission.

The invention also relates to a method of reproducing audio and/or video information transmitted and received in accordance with the methods mentioned above. The information is divided into primary, secondary and tertiary programs, and the primary and secondary programs are transmitted as usually in an alternating sequence and the tertiary programs are transmitted parallel to the primary and/or secondary programs. During operation, the method switches between the following three modes:

- (a) a "normal mode", in which the primary and secondary programs are reproduced as transmitted, i.e. "in real time";
- (b) a "pause mode" that can be activated by a user at any time; in this mode the reproduction of the primary program is interrupted and tertiary programs are reproduced instead, and currently transmitted and received programs are applied to and stored in a buffer;
- (c) a "resume mode" that can be activated by a user at any time during a "pause mode"; in this "resume mode" the storage of currently received programs in the buffer is continued and the reproduction of primary programs is resumed from the instant at which it

was interrupted, the primary programs being retrieved from the buffer while any interposed secondary program are left out; the "resume mode" being automatically finished with a return to the "normal mode" if the primary program currently reproduced from buffer ends during the "real time" transmission of the secondary program that follows this primary program in
5 the transmission sequence.

In the "normal mode", the method simply reproduces the alternating sequence
of primary and secondary programs as predetermined by the transmission. The secondary
programs may especially consist of commercials. Tertiary programs are received - but not
reproduced - parallel to the primary and/or secondary programs. If the user wishes to pause
10 while watching the primary program, e.g. to answer a phone call, he activates the "pause
mode". In the "pause mode" the reproduction of the primary program is interrupted, but
nothing of the primary program is lost because it is immediately redirected to a buffer, where
it is stored. Instead of the primary program, tertiary programs are displayed. Preferably, the
tertiary programs consist of commercials, which in this way reach the consumer at a point of
15 time chosen by the consumer himself.

If the consumer wants to resume watching of the primary program, he
deactivates the "pause mode". This results in a transition to a "resume mode", in which the
reproduction of the tertiary programs is interrupted and the reproduction of the primary
program is resumed, from the very instant at which it was interrupted the last time. The
primary program is read from the buffer where it was stored since the interruption.
20 Meanwhile, the storage of the incoming transmission of programs is continued, thereby
guaranteeing that no information is lost.

In the "resume mode" no secondary programs are reproduced. This exclusion
of secondary programs saves time, thus allowing the reproduction of primary programs from
25 the buffer to catch up with the real time transmission of primary and secondary programs.
Eventually, a point is reached where the primary program currently reproduced from the
buffer ends during the real-time transmission of the secondary program that follows this
primary program in the transmission sequence. At this point, a change back to the "normal
mode" is effected, and reproduction is continued with the real-time secondary program.

30 As the secondary programs are reproduced neither in the "pause mode" nor in
the "resume mode", it is preferred that they are not stored in the buffer during these modes,
which saves storage capacity.

If the user activates the "pause mode" during the reproduction (and
transmission) of a secondary program in the "normal mode", the reproduction of this

secondary program may be continued until the program is finished, after which reproduction of tertiary programs may follow. Alternatively, the reproduction of the secondary program may be interrupted at once and followed by the reproduction of tertiary programs.

Moreover, it is obviously possible to (re)activate the "pause mode" during the
5 "resume mode" without any loss of primary programs.

According to a preferred embodiment of the invention, tertiary programs are transmitted expanded in time, stored in a memory, and reproduced from this memory in the "pause mode". Moreover, the audio and/or video information is preferably digitally coded. Digital coding makes it possible to transmit a tertiary program of a certain duration over a
10 much longer period of time, i.e. "expanded". Thus, the tertiary programs can be transmitted parallel to the primary programs and secondary programs, using a small bandwidth only. Due to the expanded transmission, the tertiary programs must be stored in a memory to guarantee that they can be reproduced, if desired, from this memory in real time, i.e. in the "pause mode".

15 Of course, the available memory space in the buffer is precious, and therefore parts of the buffer/memory should be designated as free as soon as the programs stored therein have been output and reproduced once. These parts of the buffer/memory can then be used again to store incoming transmissions, i.e. primary/tertiary programs.

20 According to another embodiment of the invention, the transition from the "pause mode" to the "resume mode" is delayed until the currently reproduced tertiary program ends. In this way it is guaranteed that a tertiary program once started, e.g. a commercial, is finished before the reproduction of the primary program is continued.

25 The transmission of the primary, secondary, and tertiary programs may originate from any suitable source, e.g. from a recording device like a VCR, or from a broadcast by a radio transmitter. Therefore, it is also possible that an original broadcast by a radio transmitter is first recorded on a VCR or the like and is later transmitted from this device to a display station. In this case, the method according to the invention may be applied both during the original broadcast and during playback from the recording device.

30 The invention also relates to a method of transmitting and reproducing audio and/or video information transmitted in parallel on several channels, the information in each channel being divided into primary and secondary information. Preferably, the primary information consists of conventional programs which are of primary interest to a user, and the secondary information consists of commercials, which are preferably transmitted parallel to the primary information. The user can select one of said channels, and the primary

information of the selected channel is reproduced. Moreover, the method includes an "information mode", which is initiated each time the user has changed the selected channel, and which is finished a given period of time after initiation, the secondary information being reproduced parallel to or instead of the primary information during the information mode. If 5 the user changes the channel before the end of said period of time, a new information mode is initiated each time.

This method allows the reproduction of additional information, especially advertising information each time that the user has changed a channel. The advertising information may e.g. consist of a message "This program is brought to you by XYZ". The 10 advertising information thus reaches the user at an instant which is determined by the user himself by changing the channel.

Preferably, the reproduction of the secondary information is started only a given period of time after a change of channels occurred. In this way it is guaranteed that reproduction takes place only if the user has decided to stay at the particular channel for a longer period of time.

According to a preferred embodiment of the method, the secondary information is transmitted parallel to the primary information. It may be expanded in time, stored in a memory, and reproduced from this memory in the information mode. Moreover, the audio and/or video information is preferably digitally coded. Digital coding makes it 20 possible to transmit secondary information of a certain duration over a much longer period of time, i.e. "expanded". Thus, the secondary information can be transmitted parallel to the primary information, using a small bandwidth only. Due to the expanded transmission, the secondary information must be stored in a memory to guarantee that it can be reproduced from this memory in real time, if desired, i.e. in an information mode.

The transmission of the primary and secondary information may originate 25 from any suitable source, e.g. from a recording device like a VCR, or from a broadcast by a radio transmitter. Therefore, it is also possible that an original broadcast by a radio transmitter is first recorded on a VCR or the like and is later transmitted from this device to a display station. In this case, the method according to the invention may be applied both 30 during the original broadcast and during playback from the recording device.

The methods described above are preferably combined. Thus, in the transmission of primary, secondary, and tertiary programs designated for the implementation of a "pause mode" etc., the secondary and/or tertiary programs preferably serve as secondary information for the implementation of an "information mode".

Moreover, the invention relates to a receiver for audio and/or video information divided into primary, secondary, and tertiary programs, characterized in that it can receive and discriminate primary and secondary programs transmitted in an alternating sequence and tertiary programs transmitted parallel to the primary and secondary programs.

5 The invention also relates to a device for the reproduction of audio and/or video information divided into primary, secondary, and tertiary programs, which device includes

(A) a receiver of the above-mentioned type, which can receive and discriminate primary and secondary programs transmitted in an alternating sequence and 10 tertiary programs transmitted parallel to the primary and secondary programs,

(B) a buffer connected to the receiver for the intermediate storage of audio and/or video information,

(C) a reproducing unit connected to the receiver and the buffer for the reproduction of audio and/or video information,

15 (D) a control unit connected to the receiver, the buffer, and the reproducing unit, which control unit allows switching between the following modes:

(a) a "normal mode", in which the primary and secondary programs received by the receiver are reproduced as transmitted, i.e. "in real time";

20 (b) a "pause mode", which can be activated via an input by a user at any time; in this mode the reproduction of the primary program is interrupted and tertiary programs are reproduced instead, currently transmitted programs received by the receiver being applied to and stored in the buffer;

(c) a "resume mode", which can be activated via an input by a user at any time during a "pause mode"; in this "resume mode" the application and storage of currently 25 transmitted programs received by the receiver to and in the buffer is continued, and the reproduction of primary programs is resumed from the instant at which it was interrupted, the primary programs being retrieved from the buffer while any interposed secondary programs are left out; the "resume mode" being automatically finished with a return to "normal mode" if the primary program currently reproduced from the buffer ends during the "real time" 30 transmission of the secondary program that follows this primary program in the transmission sequence.

This device can implement the first methods described above. Consequently, the advantages resulting from these methods can be achieved. Moreover, the device can be modified in accordance with the preferred variants of the methods described above.

The device may especially include a playback unit which reproduces recorded audio and/or video information divided into primary, secondary, and tertiary programs, the primary and secondary programs being transmitted to the receiver in an alternating sequence and the tertiary programs being transmitted to the receiver parallel to the primary and secondary programs.

Moreover, the invention relates to a device for the reproduction of audio and/or video information transmitted in parallel in a plurality of channels, the information in each channel being divided into primary and secondary information, the device including

(A) a receiver that can receive and discriminate primary and secondary information, the secondary information being preferably transmitted parallel to the primary information,

(B) optionally, a buffer for the intermediate storage of audio and/or video information,

(C) optionally, a decoder that can determine if the secondary information is suited for reproduction after a change of channel,

(D) a reproducing unit connected to the receiver for the reproduction of the audio and/or video information,

(E) a control unit connected to the receiver, buffer, decoder, and the reproducing unit, the control unit allowing a user to select one of a plurality of channels and to apply the primary information of the selected channel from the receiver to the reproducing unit,

the control unit further initiating an information mode each time the selected channel is changed and terminating this information mode a given period of time after initiation, the secondary information being applied to the reproducing unit parallel to or instead of the primary information in the information mode.

This device is capable of implementing the method described above.

Consequently, the advantages resulting from this method can be achieved. Moreover, the device can be modified in accordance with the preferred variants of the method described above.

The device may especially include a playback unit that transmits recorded audio and/or video information to the receiver in a plurality of selectable channels, the information in each channel being divided into primary and secondary information.

The invention will now be described by way of example with reference to the accompanying drawing. The sole Figure schematically depicts three stages of operation with

different modes ("normal", "pause", "resume") occurring in a device according to the invention for reproducing audio and/or video information by means of a display unit or monitor 3. Instead of a monitor 3 an output could be provided that serves as an interface to another suitable device.

5 Traditionally, primary programs P₁, P₂, ... and commercials (secondary programs) C₁, C₂, ... are broadcast alternately, and viewers of a primary program are inevitably confronted with commercials. However, "smart" digital recording devices enable viewers to record or delay a program and skip the commercials very easily. Moreover, the number of channels may be so large and EPGs so powerful that viewers can easily find and
10 tune to another interesting channel. On the other hand, commercials are also interesting for viewers in that they may lead to a reduction of the costs of watching a program. Both viewers and advertising companies benefit if these commercials are well targeted and well timed. A commercial is well timed after a program, before a program, and/or when the viewer indicates he wants to take a break and presses "pause" or "stop" on his TV/VCR/STB (remote) control. Such a timing is achieved with the present invention.

15 In order to be able to switch to commercials at any time, commercials have to be recorded. Digital broadcast and recording makes it possible to broadcast a 25 second commercial over a much longer period of time using only limited bandwidth. The invention therefore proposes to broadcast commercials C₁, C₂, ... in real-time after each program (as is the case traditionally) and commercials C_{1*}, C_{2*}, ... stretched in time (to save bandwidth) in parallel with the programs. The low-bandwidth time-expanded channel is constantly stored in a memory 4.

20 The reception of primary and secondary programs P₁, P₂, ... C₁, C₂, ... in an alternating sequence and the parallel reception of tertiary programs C_{1*}, C_{2*}, ... is schematically shown in the dotted box that indicates the receiver 1. During "normal mode"
25 (left part of the Figure), the primary programs P₁ and P₂ and the secondary program C₁ are applied directly from the receiver 1 to the monitor 3.

30 The storage unit 2 consists of a memory 4 for the tertiary programs and a buffer 5 for the primary programs. The tertiary programs C_{1*}, C_{2*}, ... are continuously stored in memory 4.

The operation of the device changes to a "pause mode" (middle part of the Figure) when the user presses "pause" (at the instant indicated in the left part of the Figure). In the "pause mode" the immediate display of the primary program P₂, of which a part P_{2'} has already been displayed, is interrupted, and the tertiary programs C_{1*}, C_{2*} are displayed

instead. To this end, the tertiary programs are retrieved from the memory 4. Meanwhile, the rest P2" of the primary program P2 and the following primary program P3 are stored in buffer 5. The secondary program C2, however, is not stored in buffer but skipped.

When the user presses "pause" again to indicate that he wants to continue

- 5 watching of the primary program P2, the system switches to the "resume mode" (right part of the Figure; at the instant indicated in the middle part of the Figure). In this mode the display of primary program P2 is resumed, the rest P2" of this program being retrieved from buffer 5. After this, the following program P3 is also read from the buffer 5. Commercials C2, C3 between these programs are omitted because they have not been stored. This omission of
10 commercials C2, C3 saves time in the real-time transmission and reception of programs and therefore the reproduction of programs from the buffer 5 can finally catch up with the real-time transmission. If this is the case, the system switches back to the "normal mode".

In summary, it can be stated that if the viewer only views the main program, the commercials after each program will be shown automatically. When the user presses "pause" during the program, the commercials that have been recorded until then will be shown and the program itself will be delayed. When he resumes watching, he can start where he left off and (some of the) the commercials broadcast at the end of the program will not be shown. In other words: he has selected time to watch commercials.

The low bandwidth commercial channel during programs can also be used to insert a small commercial message, which is displayed a short while after the viewer has tuned to the channel ("This program is brought to you by"). The best timing of this message would be when the viewer decides to watch the program for a longer time. For example, in such a method the tertiary program C1* could be displayed parallel to the primary program P1 after the channel comprising these programs has been selected. Thus, the invention also relates to a method of recognizing secondary/tertiary programs that are suitable for display right after a change in channel or recording. If the program is recorded, the time-expanded commercials can also be recorded, which means that the commercials could be displayed even if the program is viewed after some time or for a second time.

30 List of references:

- 1 receiver
2 storage unit
3 display
4 memory

5	buffer
P1, P2, ...	primary programs
P2', P2"	first and second part of P2
C1, C2, ...	secondary programs (commercials)
C1*, C2*, ...	tertiary programs (commercials)